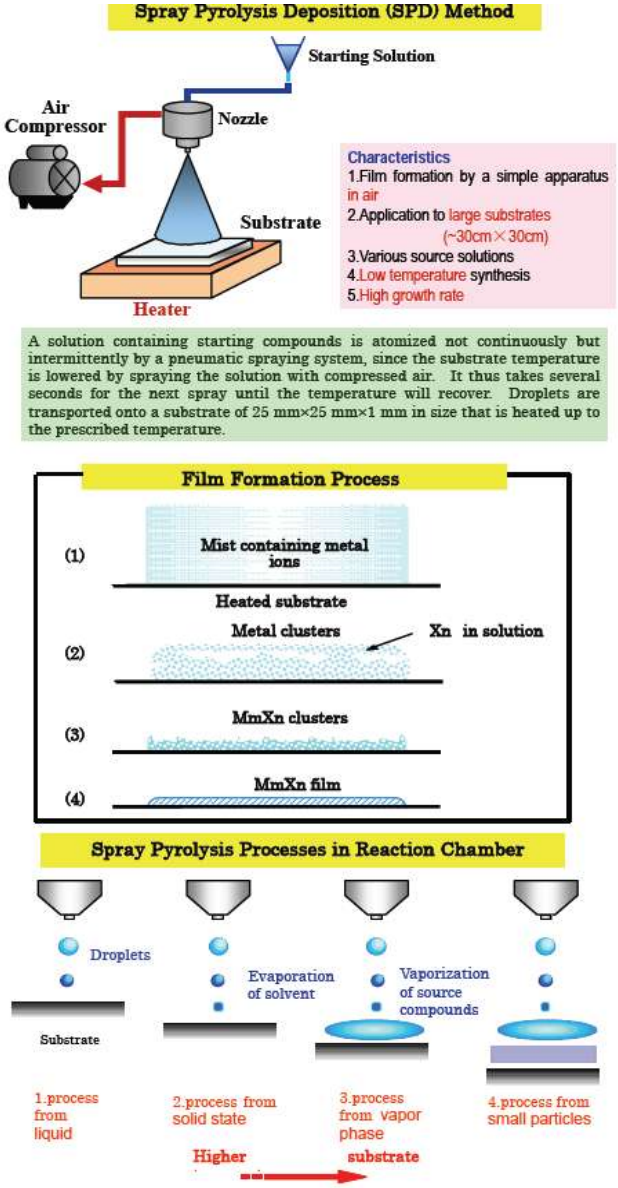
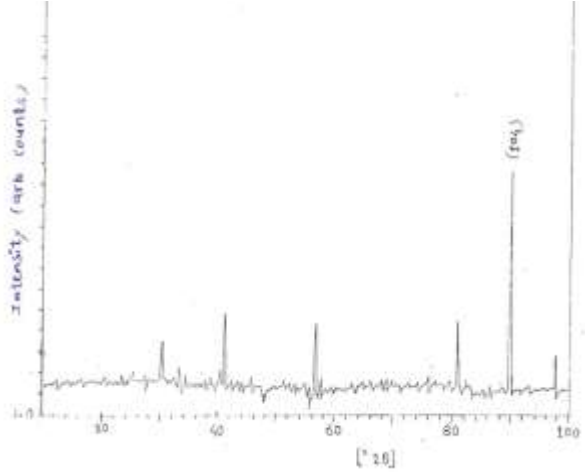


Figure 1.1: Spray pyrolysis technique



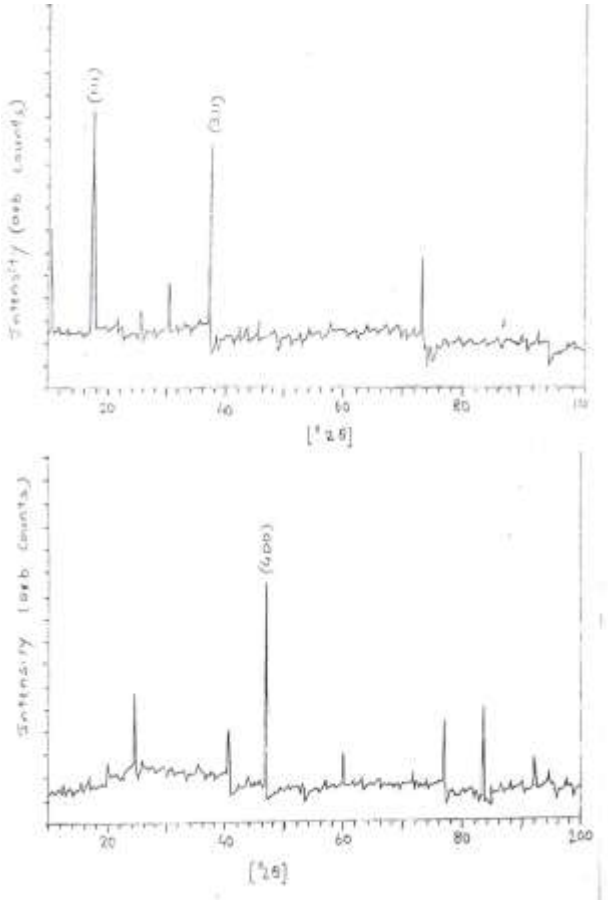


Figure 1.2: The diffraction pattern obtained for samples T1, T2, and T3

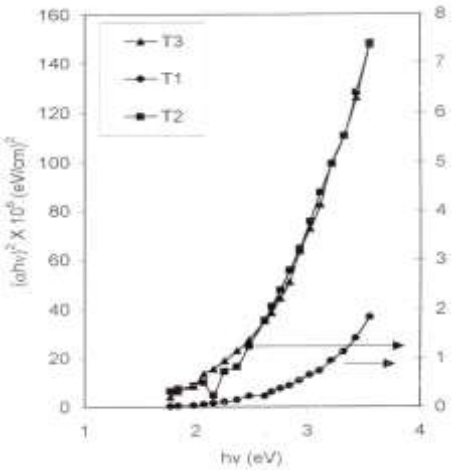


Figure 1.3: Direct band gap energy

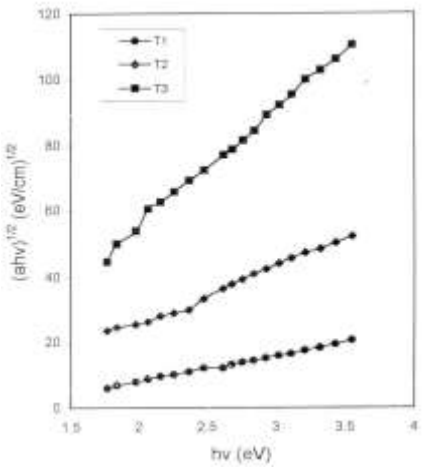


Figure 1.4: Indirect band gap energy

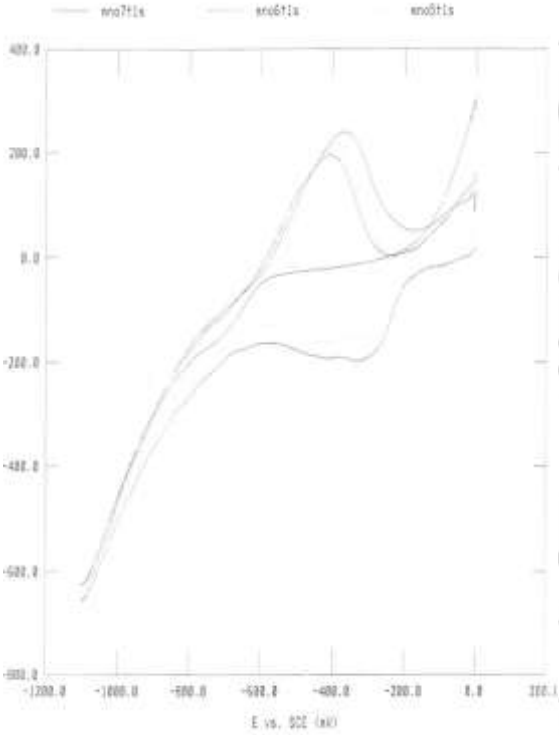


Figure 1.5: Cyclic Voltammogram of T1

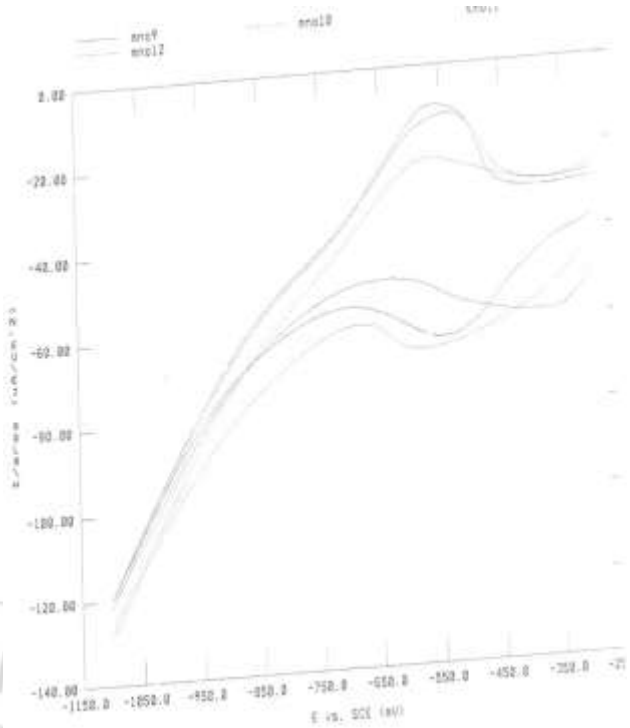


Figure 1.6: Cyclic Voltammogram of T2

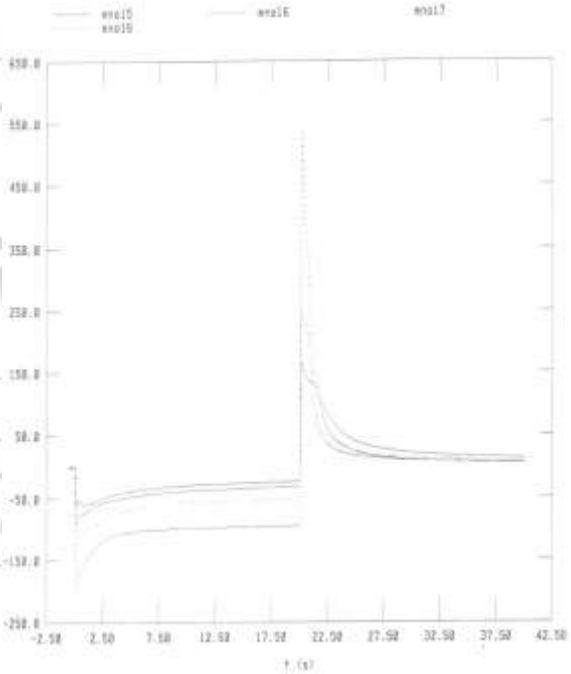


Figure 1.7: Chronoamperometry of T2

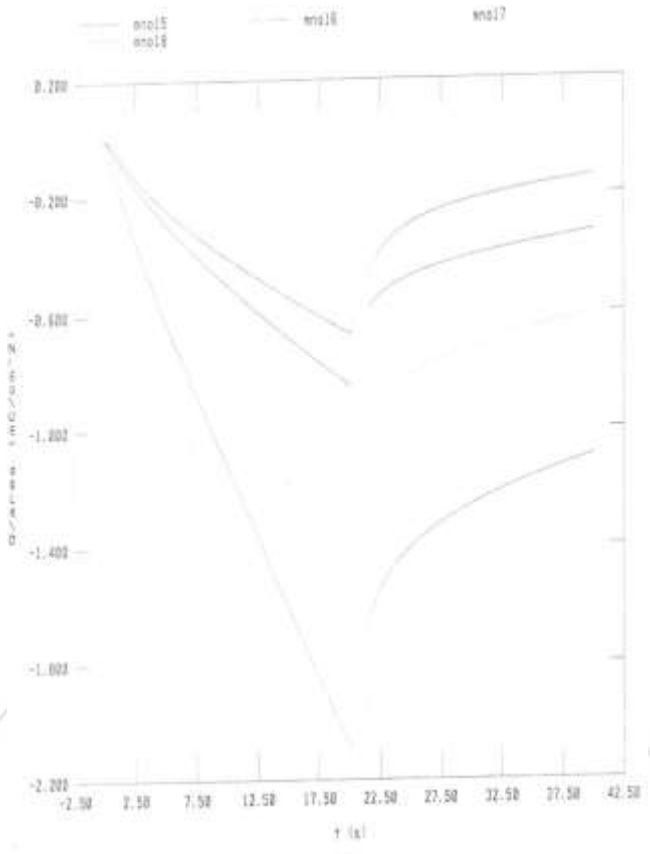


Figure 1.8: Chronocoulometry of T2

Table 1: X-ray diffraction data

Substrate temperature (^oC)	observed'd' values (Å)	standard'd' values (Å)	(hkl)	Phase	System
200 (T1)	1.1041	1.0945	(104)	$Mn(OH)_2$	Hexagonal
250 (T2)	4.7362	4.734	(001)	$Mn(OH)_2$	Hexagonal
	2.4169	2.42	(311)	λ-MnO_2	Cubic
300 (T3)	1.9321	2.0100	(400)	λ-MnO_2	Cubic

Table 2: Various electrochemical parameters deducted from Cyclic Voltammetry:

Sample	Scan rate mVS^{-1}	Ep_a 'mV'	Ep_c 'mV'	Ip_a 'µA/$cm^{2'}$	Ip_c 'µA/$cm^{2'}$	Δ Ep 'mV'	Area under the curve mC/cm^2	Contrast ratio	Diffusion coefficient $cm^2/sec\ 10^{-9}$	Insertion coefficient X
T2	10	560	360	8	60	200	8.946	1.35	0.62	0.0059
	20	525	530	12	66	5	4.504	1.35	1.48	0.0037
	50	560	510	21	70	50	1.968	1.35	3.50	0.0023
	100	575	595	23	72	20	0.995	1.35	7.22	0.0012
T1	10	370	300	240	50	70	20.71	--	0.08	--
	75	380	420	200	160	40	4.041	--	2.89	--
	100	400	560	160	200	160	3.355	--	4.93	--

Table 3: Various electrochemical parameters deducted from Chronoamperometry

Sample	Potential Step 'V'	T_c 'sec'	T_b 'sec'	Colouration Efficiency cm^2/C	Reversibility Q_{di}/Q_i	Q_i mC/cm^2	Δ OD mC/cm^2
250^0C(T2)	±1.0	12.52	32.07	17	0.528	2.12	12
	±0.8	11.89	30.36	12	0.455	1.32	12
	±0.6	11.66	32.88	9	0.475	0.80	12
	±0.4	10.69	31.85	6	0.307	0.65	12